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XXX.—*A Notice of some New Genera and Species of British Hydroid Zoophytes*\*. By JOSHUA ALDER, Esq.

[With three Plates.]

HAVING had occasion lately to examine the zoophytes of the coasts of Northumberland and Durham for the purpose of drawing up a local Catalogue for the Tyneside Naturalists' Field Club, I have been so fortunate as to meet with several undescribed species, some of which have not been before observed, and others have been misunderstood or passed over as varieties. The species here described belong to the *Anthozoa Hydroida* of Johnston.

Family *Corynidaë*.

*VORTICLAVA*, nov. gen.

Polype linear-cylindrical or clavate, soft, naked, affixed at the base, solitary? Head terminal; tentacles in two rows, stout, dissimilar, the upper row capitate.

*Vorticlava humilis*, n. sp. Pl. XII. figs. 1-4.

Body white, semitransparent, nearly of equal thickness throughout; upper tentacles five, short and stout; lower tentacles ten, about three times the length of the upper.

Length of body  $\frac{2}{10}$  inch.

On *Corallina officinalis*, in a rock-pool between tide-marks, Cullercoats.

\* Read at the late Meeting of the British Association for the Advancement of Science at Cheltenham. Four new species of *Polyzoa*, forming a part of the communication then read, have been published in the 17th Number of the Journal of Microscopical Science.

Only one specimen has yet occurred to me of this very interesting little zoophyte, which may readily escape observation on account of its diminutive size. It was observed on a branch of *Corallina officinalis* that had remained for a while in a glass of seawater, in the autumn of 1853. The pools where it was obtained have been searched several times since for additional specimens, but without success. I am happy, however, to find that the species was also found by Mr. Busk, in the same year, at Felixstowe in Suffolk. The Cullercoats specimen, which lived with me several days, showed little animation, holding itself always in a curved position as represented in fig. 2. The mouth is tubular and prominent. The upper tentacles, which surround the mouth, are short and generally curved inwards; their enlarged heads showing, when highly magnified, a congeries of little tubercles, which probably contain thread cells. The lower tentacles form a radiating circle near the base of the head.

Mr. Peach has described, in the 'Annals of Natural History' for August last, the change of a zoophyte somewhat similar to this into a naked-eyed Medusa. That gentleman's observations led him to conclude that the change was a complete metamorphosis, and not a reproduction by gemmation as is usually the case, though the exact point of transition does not appear to have been observed.

Names given to genera in this family must be considered provisional and subject to revision, should the Zoophytes afterwards prove to be the transition-state of something already known. At present this genus has as good a claim to recognition as *Clava* and some of its nearest allies.

#### Family Tubulariadae.

*Eudendrium confertum*, n. sp. Pl. XII. figs. 5-8.

*Polype* white or pale flesh-coloured, with a longish ovate head, surrounded by a single row of tentacles. *Polypary* consisting of short crowded stems rising from a common base; they are tubular, yellowish horn-coloured, strongly wrinkled across but not annulated, slightly branched, and expanding a little towards the apertures: base a densely reticulated and closely adhering crust, the interstices filled up by a membrane.

Height  $\frac{1}{4}$  to  $\frac{1}{2}$  inch.

On old shells of *Buccinum undatum* and *Fusus antiquus* from deep water, Cullercoats.

This little zoophyte appears to have been first noticed by Dr. Johnston, though he had subsequently overlooked or forgotten it, as when I sent him a description of a specimen got at

Cullercoats in 1854, he wrote me that it was not anything he was acquainted with. I have since, however, found in his Catalogue of the Zoophytes of North Durham, published in the 'Transactions of the Newcastle Natural History Society,' mention made of a zoophyte, which is undoubtedly the same as this, and the description is so characteristic that I cannot do better than adopt it. "I have observed," he says, "a small *Tubularia* which invests old specimens of *Murex antiquus* with a dense beard-like coat, and may, possibly, be a species distinct from the above (*T. ramosa*). It is only the quarter of an inch in height, slender, horny, wrinkled, slightly and irregularly branched, the branches without rings at the origins: polypes white, furnished with a single series of obtuse tentacula, that do not seem to exceed ten in number. In this respect it agrees with *T. ramosa* as characterized by Dr. Fleming, but differs from the specimens which I have seen, and also from Ellis's figure of it, in which the tentacula are much more numerous." The incrusting base, which Dr. Johnston does not appear to have examined, forbids our considering it to be the young of *Eudendrium ramosum*. The basal ramifications are corneous and more solid than the ascending stems, rather broad, flat and undulating in outline, forming a dense network, the spaces between the larger reticulations being nearly filled up with smaller ones, and the whole, in old specimens, appear to be united by a membrane. The number of tentacles is not very constant, varying with age, and occasionally reaching sixteen, but ten is the more usual number. The mouth is conical when at rest, but varies much in form, sometimes expanding to a flat disk, with a wide aperture, similar to what is occasionally seen in *Hydractinia echinata*, to the polype of which this bears a strong resemblance.

I have lately met with specimens, apparently of this species, more branched than the form above described, and showing at the top of the tube, a cup-like expansion, similar to what is represented by Van Beneden in his *E. ramosum*: the cup, though continuous with the tube, is more membranous and soon falls off. The species may therefore possibly be the same with that so well described by Van Beneden, but is not the *T. ramosa* of Linnæus, of which Ellis's figures must be taken to represent the type.

*Eudendrium capillare*, n. sp. Pl. XII. figs. 9-12.

*Polypary* minute, very slender, thread-like, a little branched, transparent, pale horn-coloured, smooth, excepting two or three faint rings near the origin of each branch. *Polypes* terminal on the upper branches, vase- or pear-shaped, with a single row of eighteen or twenty long, slender tentacles: re-

productive capsules on separate short branches near the lower part of the stem on clustered or verticillate pedicles, two or three capsules in linear series on each pedicle.

Height  $\frac{1}{2}$  inch.

Parasitical on *Antennularia ramosa*, from Embleton Bay, Northumberland, R. Embleton, Esq.

The peculiarity of this elegant and graceful little zoophyte is that the reproductive capsules are on separate branches from the polypes; the latter always terminating the upper branches, while the former are on branches near the lower part of the stem. The moniliform mode of arrangement of the capsules on the pedicles is similar to what is seen in *E. ramosum*, where, however, they are in union with the polypes, arranged round the base of the tentacles. A more near approach to the mode of arrangement in *E. capillare* may be found in Cavolini's *Sertulara racemosa* (*Eudendrium racemosum*), which has two kinds of reproductive capsules, one set of which are arranged in moniliform series on umbels very closely resembling those of our species. According to Krohn (as quoted by Professor Owen), these capsules, in the Mediterranean species, are found to contain spermatozoa, and this may possibly be the case in the present instance.

For a knowledge of this new species I am indebted to Mr. Embleton, who kindly sent it to me along with some other very interesting species collected in Embleton Bay. It was fortunately preserved in spirits, so that the characters of the animal could be distinctly made out; otherwise it might readily be taken for a *Coryne*.

#### Family Sertulariadae.

*Sertularia tricuspidata*, n. sp. Pl. XIII. figs. 1, 2.

Stem slender, alternately branched, twisted at intervals, and jointed above each cell: cells alternate, rather distant, smooth, exactly cylindrical, a little bent outwards, with a three-toothed rim; ovicapsules strongly ribbed across, with a narrow funnel-shaped aperture.

Height 1 to 2 inches.

On zoophytes from deep water on the Northumberland coast.

Without a careful examination of its characters, this species might be passed over as a small variety of *S. polyzonias*, from which it differs in the slenderness of its proportions, in the shape of the cells, and especially in their three-toothed apertures. Mr. Busk has pointed out to me that there is a species very nearly resembling this found in the South Seas—the *S. Johnstoni* of Gray, of which he has kindly sent me a specimen from New

Zealand. Like our species it is tridentate; but on a careful comparison of the two, I find that the southern form differs from ours in the following particulars. It is of smaller size and more compact mode of growth; the cells are more closely set, smaller, shorter, broader at the base, and attached for a greater part of their length, besides having some rib-like thickenings of the walls, which are not to be found in the northern species. There are likewise occasionally two or three cells together without a joint. The ovicapsules are very similar, but the aperture is not so much produced, and is conical, not funnel-shaped. Upon the whole I think there can be little doubt that the two species are distinct. The form is at least new to the British seas.

The cells of this species do not bulge out below as in *S. polyzonias*, and the capsules are narrower and much more strongly and regularly ribbed across, with a funnel-shaped aperture, having a smooth, everted rim.

*Sertularia tenella*, n. sp. Pl. XIII. figs. 3-6.

*Sertularia rugosa*, var., Johnst. Brit. Zooph. 62. f. 8 c.

Minute, creeping, throwing up short unbranched or slightly branched stems, which are slender, zigzagged, and jointed above each cell: cells alternate, rather distant, elongate, barrel-shaped, finely wrinkled across; the aperture erect, patent, squared and four-toothed.

Length  $\frac{1}{2}$  to 1 inch.

Parasitical on *Plumularia falcata* and other zoophytes, but not common.

This pretty little species is smaller and more delicate in all its proportions than *S. rugosa*, with which it has hitherto been confounded. The cells are more erect, narrower, and more closely and regularly ribbed or wrinkled across; the wrinkles generally rising a little opposite each angle; they are six or seven in this species—in *S. rugosa* three or four. The aperture is erect, patent, and conspicuously squared and four-toothed: in *S. rugosa* the aperture is much less prominent, and is always bent outwards. The stem of *S. tenella* is slender, seldom exceeding half an inch in length, and most frequently unbranched: it is waved or zigzag, bearing a cell at each angle: opposite each cell there is a joint, above which the cell is much constricted and slightly ringed or twisted. The cells are more distant than in *S. rugosa*, in this respect resembling *S. polyzonias*, but are more slender and elongated than in either species; they are thin, delicately wrinkled transversely and produced a good deal at the top. The aperture is closed by a quadripartite operculum, open-

ing in segments as in *Campanularia syringa*, but here the segments are fewer, corresponding with the angles of the mouth. *S. rugosa* has a similar operculum. The ovicapsules, for a knowledge of which I am indebted to the Rev. T. Hincks, scarcely differ from those of *S. polyzonias* and *S. rugosa*, but are perhaps a little more produced at the top. The polypes appear to be yellow or orange-coloured. Specimens of *S. tenella* occur in which the creeping fibre throws up only single cells on short foot-stalks throughout its course. In this form it might be taken for a *Campanularia*.

### Family Campanulariadae.

#### *Campanularia volubilis*. Pl. XIII. fig. 7.

*Sertularia volubilis*, Linn. Syst. Nat. 12th ed. 1311; Ellis, Brit. Corall. 24. t. 14. f. a A.

Stem creeping, sometimes giving off shoots in a free state, generally spirally twisted; pedicles rather longish, spirally twisted, and not ringed at the base; a single spherical ring below each cell; cells generally rather narrow and deep, with about ten shallow blunt denticles round the margin: ovicapsules rising on short pedicles from the creeping stem, oblong flask-shaped, smooth, with a long narrow neck.

Height about  $\frac{1}{10}$ th inch.

On *Plumularia falcata*, *Sertularia fallax*, and other zoophytes: frequent.

Three or four species have hitherto been confounded under the name of *Camp. volubilis*. It therefore becomes necessary to redescribe and discriminate them, and to ascertain, if possible, to which the Linnæan appellation properly belongs. Unfortunately the description of that author is very imperfect, but as he quotes the excellent figures of Ellis, with which his description, as far as it goes, corresponds, these may be fairly taken as representing the true *C. volubilis*. The distinguishing character of the species there represented is the spirally twisted stem; and Ellis remarks in his description, that "at the bottom of each [cup], where they join the stalk, the microscope discovers to us a very minute spherule or little ball, as in some drinking glasses." With these characters the species here described perfectly agrees. I have for some time been satisfied that this was distinct from the *C. volubilis* of Johnston and other modern British authors, but it was not until lately that I was so fortunate as to meet with its ovicapsules, the peculiar form of which will, I think, remove all doubt on the subject. This species is almost equally common on our coast with that described by Dr. Johnston (which

I propose calling *C. Johnstoni*), but on account of its usually inhabiting deeper water, it is not so generally met with. They may, however, be occasionally found mixed together on the same zoophyte, particularly on the stem of *Plumularia falcata*; but when their peculiar characters are known, they can readily be distinguished from each other. *C. volubilis*, as here distinguished, is scarcely more than half the size of *C. Johnstoni*, and has the cells usually narrower and more cylindrical, with the crenations of the margins blunter and shallower. But the best distinguishing character is in the pedicle, which in this species is always spirally twisted throughout, though becoming less marked towards the top, where a single spherule supports the cup. The creeping stem is generally, but not always, twisted when attached; but when, as is often the case, it becomes free, its spirally twisted character is beautifully displayed, and it has the appearance of a minute transparent cord, with a club-shaped termination. The pedicles and cells arising from the free part of the stem are always shorter than where it is attached, and more nearly resemble Ellis's figure. The ovicapsules are oblong flask-shaped, smooth, compressed laterally and produced into a very long and narrow neck; they arise from the creeping stem by a short pedicle of two whorls.

*Campanularia Johnstoni*. Pl. XIII. fig. 8.

*Camp. volubilis*, Johnst. Brit. Zooph. 107, woodcut 18; Couch, Cornish Fauna, 40. t. 2. f. 1; Gosse, Ramb. Dev. Coast, 296. t. 18.

Stem creeping, plain; pedicles long, with numerous close-set rings at the base, and more or less ringed at the top; the middle part usually plain; cells deep and rather large, with ten or twelve strong denticles round the rim: ovicapsules nearly sessile on the creeping stem, ovate oblong, strongly plicated transversely and truncated at top.

Height  $1\frac{1}{2}$  tenth.

On sea-weeds, zoophytes, and shells, from between tide-marks to deep water: common.

This species is of more robust growth than the last, with the cells larger and more strongly denticulated; they are also wider, but this character is rather variable in both species. The pedicles are longer and stouter, and have always numerous close-set rings at the base, and also several rings at the top: the middle part is variable, sometimes partially or even wholly ringed, but more frequently plain\*. The creeping fibre is always plain, and

\* It is important in this genus to distinguish between rings and spiral ridges.

seldom if ever detached. The ovicapsules are large, ovate or subcylindrical, more or less elongated, with a truncated top, and very strongly plicated transversely; they rise from the creeping stem by scarcely perceptible pedicles. (Mr. Gosse has represented a spur at the bottom which I have not observed.) It may be a question for future solution, whether this species is ever branched. I have found branched specimens from deep water very much resembling this, with a ringed base and strongly denticulated cup, which I believe to be the young of *Laomedea dichotoma*  $\beta$ , Johnst. (*Sert. longissima*, Pallas), having once found an example a little more advanced, with the ovicapsules of that species. In Ellis and Solander's 'Zoophytes,' however, a figure is given of a branched specimen under the name of *Sertularia volubilis*, with vesicles resembling *C. Johnstoni*.

*Campanularia Hincksii*. Pl. XIII. fig. 9.

*Camp. volubilis*, var., Hincks in Ann. Nat. Hist. 2nd ser. vol. xi. p. 180.

Stem creeping, plain; pedicles long, nearly smooth, with two or three slight spiral twists at the base, and two or three spherical rings at the top, one of which is within the cup: cells rather long, with parallel sides, wrinkled or lineated longitudinally; marginal denticles ten, of a squared or castellated form, a little indented at top.

Height  $1\frac{1}{2}$  to 2 tenths.

On shells and zoophytes from deep water: rather rare.

This species differs from the two former in the castellated form of the rim, and also in the shape of the cup, which is broad at the base and lineated longitudinally; the spherical ring within the cup is also a distinguishing character. The pedicle is long and quite smooth, with the exception of one or two rings at its junction with the cell, and a slight spiral twisting at the base. In this respect it differs from the *C. volubilis* of Van Beneden, the cells of which, though differing in shape, have a somewhat similar castellated rim, but the pedicle is short and strongly annulated throughout. This latter will probably constitute a fourth species. The *C. Hincksii* was first noticed by Mr. Hincks, who described it in the 'Ann. Nat. Hist.' for March 1853, as a curious variety of *C. volubilis*, from specimens sent him by Mr. Templar from the West of England. I have since met with it sparingly from deep water on the Northumberland coast. Mr. Hincks informs me that in his specimen the ovicapsules were apparently smooth, but from their imperfect state of preservation, this character was not satisfactorily made out. My specimens are without capsules.



*Campanularia gracillima*, n. sp. Pl. XIV. figs. 5, 6.

Stem erect, compound, subunilaterally branched; cells very slender, long, tubular, thin, set on loosely twisted pedicles of about two whorls: aperture entire.

Height 1 inch.

On shells and zoophytes from deep water, Northumberland coast: occasionally.

This is a critical species, greatly resembling *C. dumosa*, from which it can only be distinguished by comparative characters, though its general appearance and habit at once strike the eye as something distinct. It is much smaller than *C. dumosa*, thinner in texture and more flexuose when fresh, with narrower cells, set on longer pedicles. The stem is erect, and generally compounded of two or three tubes, diminishing to one at the ends of the branches. It is a good deal branched, the branches often rising more from one side of the stem than the other. The cells are long, very slender, thin and transparent, with a smooth rim; they are set on pedicles, about one-fourth the length of the cells, loosely twisted and making about two turns; they generally rise at a less angle from the stem than in *C. dumosa*, and are more fragile, being very apt to fall off when dry. The cells of *C. dumosa*, on the contrary, are more persistent than in any other species of the genus. *C. gracillima* appears usually to assume the erect form; only in one instance have I observed it creeping over the surface of a shell near the base of the ascending stem.

A *Campanularia* from Bass's Straits, of which Mr. Busk has sent me a drawing, is very similar to this, if not identical.

#### GENUS GRAMMARIA, *Stimpson*.

“Polypidom rectilinear, elongated, cylindrical, composed of aggregated tubes, generally without branches, which, when they occur, are of the same character as that from which they spring. Cells arranged on all sides in more or less regular and equidistant longitudinal rows, giving the section of the stem a star-like appearance.”—*Stimpson*.\*

*G. ramosa*, n. sp. Pl. XIV. figs. 1-4.

Polypary stout, horn-coloured, irregularly branched, the branches rising from a constricted base: cells cylindrical, bending outwards to a distance nearly equalling the width of the stem, with an even margin, behind which they are frequently annulated with one or two lines of growth; they are

\* Synopsis of the Marine Invertebrata of Grand Manan, p. 9. t. 1. f. 3.

set in about four longitudinal rows, the adjoining cells alternating, and the opposite cells nearly on a line with each other.

Height 1 to 2 inches.

From the deep-water fishing-boats, on the coasts of Northumberland and Durham: rather rare.

This species comes very close to the *Grammaria robusta* of Stimpson, of which it may possibly be a variety, the principal difference being that the British form is constantly branched, while the American species is linear and straight. The genus is new to Europe, and does not appear to differ much from the *Salacia* of Lamouroux founded on an Australian species.

#### EXPLANATION OF PLATES XII., XIII., XIV.

##### PLATE XII.

- Figs. 1, 2. Vorticlava humilis*, natural size and magnified.  
*Fig. 3.* A tentacle of the lower row much enlarged.  
*Fig. 4.* Ditto of the upper row ditto.  
*Figs. 5, 6. Eudendrium confertum*, natural size and magnified.  
*Fig. 7.* A polypary of the same, magnified.  
*Fig. 8.* A tentacle contracted and very highly magnified.  
*Figs. 9, 10. Eudendrium capillare*, natural size and magnified.  
*Fig. 11.* A polype of the same, more highly magnified.  
*Fig. 12.* Reproductive capsule (sperm-capsule?), more highly magnified.

##### PLATE XIII.

- Figs. 1, 2. Sertularia tricuspidata*, natural size and magnified.  
*Figs. 3, 4. — tenella*, natural size and magnified.  
*Fig. 5.* Ovicapsule of the same.  
*Fig. 6.* A polype-cell showing the operculum.  
*Fig. 7. Campanularia volubilis*, highly magnified.  
*Fig. 8. — Johnstoni*, ditto.  
*Fig. 9. — Hincksi*, ditto.

##### PLATE XIV.

- Fig. 1. Grammaria ramosa*, natural size.  
*Fig. 2.* Another specimen magnified.  
*Fig. 3.* A portion of the same more highly magnified.  
*Fig. 4.* A section of the stem of the same.  
*Fig. 5. Campanularia gracillima*, nat. size.  
*Fig. 6.* A portion of the same, magnified.